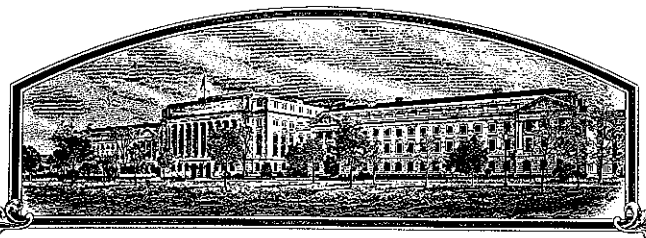


No. 9600332

THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Pioneer Hi-Bred International, Inc.

Whereas, THERE HAS BEEN PRESENTED TO THE

Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED DISTINCT VARIETY OF SEXUALLY REPRODUCED, OR TUBER PROPAGATED, PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF TWENTY YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR CONDITIONING IT FOR PROPAGATION, OR STOCKING IT FOR ANY OF THE ABOVE PURPOSES, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT. (84 STAT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

ALFALFA

'5681'

In Testimony Whereof, I have hereunto set my hand and caused the seal of the Plant Variety Protection Office to be affixed at the City of Washington, D.C. this thirtieth day of July in the year of our Lord one thousand nine hundred and ninety-nine.

Attest:

Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

Secretary of Agriculture

REPRODUCE LOCALLY. *Include form number and date on all reproductions.* FORM APPROVED - OMB NO. 0581-0055

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY DIVISION - PLANT VARIETY PROTECTION OFFICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions and information collection burden statement on reverse)

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) *(as it is to appear on the Certificate)*
Pioneer Hi-Bred International, Inc.

2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER
XAS44

3. VARIETY NAME
5681

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)*
7305 N.W. 62nd Ave.
P.O. Box 287
Johnston, IA 50131

5. TELEPHONE *(include area code)*
(515) 270-3340

6. FAX *(include area code)*
(515) 270-3750

FOR OFFICIAL USE ONLY

PVPO NUMBER: 9600332

FILING DATE: August 13, 1996

FEES RECEIVED
FILING AND EXAMINATION FEE: $ 2450.00
DATE: August 13, 1996
CERTIFICATION FEE: $ 300.00
DATE: 3/1/99

7. GENUS AND SPECIES NAME
Medicago sativa

8. FAMILY NAME *(Botanical)*
Leguminosae

9. CROP KIND NAME *(Common name)*
Alfalfa

10. IF THE APPLICANT NAMED IS NOT A "PERSON", GIVE FORM OF ORGANIZATION *(corporation, partnership, association, etc.) (Common name)*
Corporation

11. IF INCORPORATED, GIVE STATE OF INCORPORATION
Iowa

12. DATE OF INCORPORATION
May 6, 1926

13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS

~~William T. W. Woodward~~
~~7305 N.W. 62nd Ave.~~
~~P.O. Box 287~~
~~Johnston, IA 50131~~

MARY LETSCH
Dept. of Alfalfa Research
Pioneer Hi-Bred International, Inc.

~~Debra Blair~~
~~700 Capital Square~~
~~400 Locust~~
~~Des Moines, IA 50309~~

7305 N.W. 62nd Ave.
Johnston IA 50131

14. TELEPHONE *(include area code)*
47
(515) 270-3340

15. FAX *(include area code)*
(515) 270-3750

email: Letsch@phibred.com

16. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED *(Follow instructions on reverse)*

Above changes AAA 31Aug1999 per email

- a. ☑ Exhibit A. Origin and Breeding History of the Variety
- b. ☑ Exhibit B. Statement of Distinctness
- c. ☑ Exhibit C. Objective Description of the Variety
- d. ☑ Exhibit D. Additional Description of the Variety (Optional)
- e. ☑ Exhibit E. Statement of the Basis of the Applicant's Ownership
- f. ☑ Voucher Sample *(2,500 viable untreated seeds or, for tuber propagated varieties verification that tissue culture will be deposited and maintained in an approved public repository)*
- g. ☑ Filing and Examination Fee ($2450), made payable to "Treasurer of the United States" *(Mail to PVPO)*

17. DOES THE APPLICANT SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? *(See Section 83(a) of the Plant Variety Protection Act)*

☐ YES *(If "yes," answer items 18 and 19 below)* ☑ NO *(If "no," go to item 20)*

18. DOES THE APPLICANT SPECIFY THAT SEED OF THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?

☑ YES ☐ NO

19. IF "YES" TO ITEM 18, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?

☑ FOUNDATION ☐ REGISTERED ☑ CERTIFIED

20. HAS THE VARIETY OR A HYBRID PRODUCED FROM THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETED IN THE U.S. OR OTHER COUNTRIES?

☐ YES *(If "yes," give names of countries and dates)* ☑ NO

21. The applicant(s) declare that a viable sample of basic seed of the variety will be furnished with application and will be replenished upon request in accordance with such regulations as may be applicable, or for a tuber propagated variety a tissue culture will be deposited in a public repository and maintained for the duration of the certificate.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced or tuber propagated plant variety, and believe(s) that the variety is new, distinct, uniform, and stable as required in Section 42, and is entitled to protection under the provisions of Section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

SIGNATURE OF APPLICANT *(Owner(s))*		SIGNATURE OF APPLICANT *(Owner(s))*	
WTW Woodward			
NAME *(Please print or type)*		**NAME** *(Please print or type)*	
William T.W. Woodward			
CAPACITY OR TITLE	**DATE**	**CAPACITY OR TITLE**	**DATE**
Director, Department of Alfalfa Research	9/5/96		

Exhibit A

Origin and Breeding History of the Variety

'5681'

5681 is a synthetic variety comprised from 195 parental plants originating from two Pioneer experimental lines and Archer which trace to Archer (34%), Meteor (16%), CUF101 (16.7%), 555 (5%), 524 (5.6%), Apollo (3.1%), NCMP10 (3.0%), Mercury (2.7%), Saranac (1.6%), 5432 (1.1%). It also traces back to know and unknown varieties with smaller contribution such as 526 (0.95%), 5331 (0.32%), Maryland (0.30%), Narragansett (0.14%), Iroquois (0.14%), Atra55 (0.14%), Team (0.14%), Culver (0.11%) and Vernal (0.03%). Seed was harvested from individual plants in 1991 in "cage isolation" and bulked to produce Syn 1 breeder seed. Parent plants were selected through phenotypic recurrent selection for anthracnose, Phytophthora root rot, and spring black stem.

During seed multiplication, no variation beyond the limits defined under Exhibit C have been found. Multiplication procedures will insure that seed being sold as 5681 will not be shifted in characteristics beyond presently acceptable limits for alfalfa varieties.

It is confirmed that 5681 meets presently acceptable levels for uniformity for alfalfa varieties.

Note to the examiner : NCMP10 is referenced in D.E. Rowe, R.Y. Gurgis, R. E. Welty, M.W. Nielson, T.H. Busbice. 1982. Crop Science Registration. Crop Sci. 22(6) : 1267.

EXHIBIT B

NOVELTY STATEMENT

'5681'

5681 most closely resembles the variety '5683'. 5681 differs from 5683 in anthracnose and Verticillium wilt resistance, being classified as having high resistance and moderate resistance, respectively while 5683 is suseptible to the two diseases.

Zero % Resistance Anthracnose in PV # 8900181 ('5683') and per phone Conversation on 3/22/99 MH

9600332

FORM APPROVED OMB NO. 0581 0055

EXHIBIT C
(ALFALFA)

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
LIVESTOCK AND SEED DIVISION
PLANT VARIETY PROTECTION OFFICE
BELTSVILLE, MARYLAND 20705

OBJECTIVE DESCRIPTION OF VARIETY
ALFALFA *(Medicago sativa* sensu Gunn et al.)

NAME OF APPLICANT(S)	TEMPORARY DESIGNATION	VARIETY NAME
Pioneer Hi-Bred International, Inc.	XAS44	5681

ADDRESS *(Street and No., or R.F.D. No., City, State, and Zip Code)*
7305 N.W. 62nd Ave., P.O. Box 287
Johnston, IA 50131

FOR OFFICIAL USE ONLY
PVPO NUMBER 9600332

PLEASE READ ALL INSTRUCTIONS CAREFULLY: Place numbers in the boxes to designate the expressions which are characteristic of the commerical generations of the application variety. Data for quantitative plant characters should be based on a minimum of 100 plants. Include leading zeros when necessary (e.g. 0 8 9 for quantitative data. Comparative data should be determined from varieties entered in the same trial.Plant color may be precisely designated by using any recognized color chart.e.g., The Munsell Plant Tissue Color Charts.

1. WINTERHARDINESS:

[ ] CLASS:

1 = Very Non-Winterhardy (CUF 101)
2 = Non-Winterhardy (Moapa 69)
3 = Intermediately Non-Winterhardy (Mesilla)
4 = Semi-Winterhardy (Lahontan)
5 = (Du Puits)
6 = Moderately Winterhardy (Saranac)
7 = (Ranger)
8 = Winterhardy (Vernal)
9 = Extremely Winterhardy (Norseman)

TEST LOCATION: _____

2. FALL DORMANCY:

FALL DORMANCY (DETERMINED FROM SPACED PLANTINGS)

TESTING INSTITUTION AND LOCATION	DATE OF LAST CUT	DATE REGROWTH SCORED	REGROWTH SCORE OR AVERAGE HEIGHT				LSD .05
			APPLICATION VARIETY	CHECK VARIETIES*			
				Archer	Meteor	Sutter	
Pioneer Hi-Bred International,Inc., Kerman, California	10/95	11/95	29.9	27.5	31.0	36.8	5.9

* CUF 101, Moapa 69, Mesilla, Lahontan, Du Puits, Saranac, Ranger, Vernal, or Norseman as appropriate.

Specify scoring system used: Standard Test - Average height in cm.

[3] Fall Growth Habit (Determined from Fall Dormancy Trials)

1 = Erect (CUF 101)
3 = Semierect (Mesilla)
5 = Intermediate (Saranac)
7 = Semidecumbent (Vernal)
9 = Decumbent (Norseman)

3. RECOVERY AFTER FIRST SPRING CUT (In Southwest, first cut after March 21):

[ ]

1 = Very Fast (CUF 101)
3 = Fast (Saranac)
5 = Intermediate (Ranger)
7 = Slow (Vernal)
9 = Very Slow (Norseman

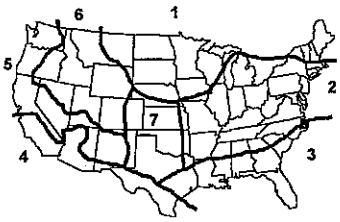
TEST LOCATION: _____

4. AREAS OF ADAPTATION IN U.S. (Where tested and proven adapted):

[5] Primary Area of Adaptation

[4] [6] Other Areas of Adaptation

1 = North Central
2 = East Central
3 = Southeast
4 = Southwest
5 = Moderately Winterhardy Intermountain
6 = Winterhardy Intermountain
7 = Great Plains
8 = Other *(Specify)* _____



5. FLOWERING DATE (When 10% of plants possess open flowers at time of first spring cut):

[ ][ ] Days Earlier Than . . . . . [ ]
Same As . . . . . [ ]
[ ][ ] Days Later Than . . . . . [ ]

1 = CUF 101
2 = Mesilla
3 = Saranac
4 = Vernal
5 = Norseman

TEST LOCATION: _____

6. PLANT COLOR (Determined from healthy regrowth 3 weeks after first spring cut, controlling leafhoppers if necessary):

[ ] 1 = Very Dark Green (524) 2 = Dark Green (Vernal) 3 = Light Green (Ranger)

COLOR CHART VALUE *(Specify chart used)* _____

APPLICATION VARIETY: _____

VERNAL: _____

TEST LOCATION: _____

7. CROWN TYPE (Determined from spaced plantings):

[2] Noncreeping Types: 1 = Broad (Vernal) 2 = Intermediate (Saranac) 3 = Narrow (CUF 101)

Creeping Types: 4 = Creeping Rooted (Rangelander) 5 = Rhizomatous (Rhizoma)

8. FLOWER COLOR (Determine frequency of plants for each color class as defined by USDA Agricultural Handbook No. 424 (Barnes 1972), allowing all plants in plot to flower):

076	% Purple and Violet (Subclasses 1.1 to 1.4)	016	% Blue (Subclasses 2.3 and 2.4)
008	% Variegated Other Than Blue (Subclasses 2.1, 2.2, 2.5 to 2.9)	t	% Yellow (Subclasses 4.1 to 4.4)
t	% Cream (Class 3)	t	% White (Class 5)

TEST LOCATION: Johnston, IA

9. POD SHAPE (Determine frequency of plants with the following pod shapes produced on well cross-pollinated racemes):

	% Tightly Coiled (One or more coils, center more or less closed)		% Loosely Coiled (One or more coils, center conspicuously open)
	% Sickle (Less than 1 coil)		TEST LOCATION:

10. PEST RESISTANCE: Provide in the appropriate column, trial data for application variety, and resistant (R) and susceptible (S) check varieties, synthetic generation tested, average severity index scores (ASI), least significant difference statistics (LSD .05), the institution in charge of test, year, and location of test, and whether test is a field or laboratory evaluation. Describe scoring system, and any test procedure which differs from standard methods proposed by Elgin (1982). Trial data from other test years or locations should be presented whenever available on a separate document as Exhibit D.
Seeds of the check varieties and germplasm lines listed below can be obtained from the USDA Field Crops Laboratory, Bldg. 001, Rm. 335, BARC-West, Beltsville, MD 20705. Although comparisons with check varieties listed below are preferred, comparisons with any appropriate check variety recommended by Elgin (1982) may be presented.

A. DISEASE RESISTANCE: DISEASE	VARIETY	SYN. GEN. TESTED	PERCENT RESISTANT PLANTS	NUMBER OF PLANTS TESTED	ASI	ASI LSD .05	INSTITUTION. YEAR. LOCATION. FIELD OR LABORATORY
Anthracnose, Race 1 *(Colletotrichum trifolii)*	Application HR	1	74	~300		% Resistant Plants	Pioneer Hi-Bred International, Inc.,1994, Arlington, WI, Laboratory (Greenhouse)
	Arc (R)		65	~300		20.2	
	Saranac (S)		0.0	~300			
	SCORING SYSTEM: Standard test						
Anthracnose, Race 2 *(Colletotrichum trifolii)*	Application						
	Saranac AR (R)						
	Arc (S)						
	SCORING SYSTEM:						
Bacterial Wilt *(Corynebacterium insidiosum)*	Application R	1	46	~200		% Resistant Plants	Pioneer Hi-Bred International, Inc., 1992, Arlington, WI, Field
	Vernal (R)		42	~200		12.9	
	Narragansett (S)		2	~200			
	SCORING SYSTEM: Standard test						
Common Leafspot *(Pseudopeziza medicaginis)*	Application						
	MSA-CW3An3 (R						
	Ranger (S)						
	SCORING SYSTEM:						

10. A. PEST RESISTANCE (Continued):

DISEASE	VARIETY	SYN. GEN. TESTED	PERCENT RESISTANT PLANTS	NUMBER OF PLANTS TESTED	ASI	ASI LSD .05	INSTITUTION, YEAR, LOCATION, FIELD OR LABORATORY
Downy Mildew *(Peronospora trifoliorum)*	Application						
Isolate, if known:	Saranac (R)						
	Kanza (S)						
	SCORING SYSTEM:						
Fusarium Wilt *(Fusarium oxysporum f. medicaginis)*	Application HR	1	64	~200		% resistant plants	Pioneer Hi-Bred International, Inc., 1995, Quarryville, PA. Field.
	Moapa 69 (R) Agate (R)		54	~200		12.6	
	Narragansett (S) MNGN-1 (S)		7	~200			
	SCORING SYSTEM: Standard test.						
Phytophthora Root Rot *(Phytophthora megasperma f. medicaginis)*	Application HR	1	57	~300		% resistant plants	Pioneer Hi-Bred International, Inc., 1995, Arlington, WI. Laboratory (greenhouse).
	Agate (R) NMPD-1 (R)		46	~300		15.4	
	Saranac (S)		0.0	~300			
	SCORING SYSTEM: Standard test.						
Verticillium Wilt *(Verticillium alboatrum)*	Application MR	1	17	~200		% resistant plants	Pioneer Hi-Bred International, Inc., 1995, Arlington, WI. Laboratory (greenhouse).
	Vertus (R) Onieda VR (MR)		60	~200		15.1	
	Saranac (S)		2	~200			
	SCORING SYSTEM: Standard test						
Other *(Specify)*	Application						
	(R)						
	(S)						
	SCORING SYSTEM:						
Other *(Specify)*	Application						
	(R)						
	(S)						
	SCORING SYSTEM:						

B. INSECT RESISTANCE: INSECT	VARIETY	SYN. GEN. TESTED	PERCENT DEFOLIATION	DEFOLIATION IN PERCENT OF RESISTANT CHECK	ASI	ASI LSD .05	INSTITUTION, YEAR, LOCATION, FIELD OR LABORATORY
Alfalfa Weevil *(Hypera postica)*	Application						
	Arc (R)			100			
	Saranac (S)						
	SCORING SYSTEM:						

10. B. INSECT RESISTANCE (Continued):

INSECT	VARIETY		SYN. GEN. TESTED	PERCENT SEEDLING SURVIVAL	NUMBER OF SEEDLINGS TESTED	ASI	ASI LSD .05	INSTITUTION, YEAR, LOCATION, FIELD OR LABORATORY
Blue Alfalfa Aphid *(Acyrthosiphon kondoi)*	Application	R	1	52	~300		% resistant plants	Pioneer Hi-Bred International, Inc., 1992, Johnston, IA. Laboratory (greenhouse).
	CUF 101 (R)			55	~300		10.6	
	PA-1 (S)	Arc (S)		0	~300			
	SCORING SYSTEM:	Standard test.						
Pea Aphid *(Acyrthosiphon pisum)*	Application	R	1	49	~300		% resistant plants	Pioneer Hi-Bred International, Inc., 1991, Johnston, IA. Laboratory (greenhouse).
	Kanza (R)	Baker (R)		45	~300		16.4	
	Ranger (S)	Vernal (S)		3	~300			
	SCORING SYSTEM:	Standard test.						
Spotted Alfalfa Aphid *(Therioaphis maculata)* *Biotype, if known:*	Application	HR	1	60.0	~300		% resistant plants	Pioneer Hi-Bred International, Inc., 1992, Kerman, CA. Laboratory (greenhouse).
	Kanza (R)	Baker (R)		50.0	~300		11.6	
	Ranger (S)	Caliverde (S)		0.0	~300			
	SCORING SYSTEM:	Standard test.						

INSECT	VARIETY	SYN. GEN. TESTED	PERCENT RESISTANT PLANTS	NUMBER OF PLANTS TESTED	ASI	ASI LSD .05	INSTITUTION, YEAR, LOCATION, FIELD OR LABORATORY
Potato Leafhopper Yellowing *(Empoasca fabae)*	Application						
	MSA-CW3An3 (R)						
	Ranger (S)						
	SCORING SYSTEM:						
Other *(Specify)*	Application						
	(R)						
	(S)						
	SCORING SYSTEM:						

C. NEMATODE RESISTANCE: NEMATODE	VARIETY		SYN. GEN. TESTED	PERCENT RESISTANT PLANTS	NUMBER OF PLANTS TESTED	ASI	ASI LSD .05	INSTITUTION, YEAR, LOCATION, FIELD OR LABORATORY
Northern Root Knot *(Meloidogyne hapla)*	Application	MR	1	19	~200		% resistant plants	Pioneer Hi-Bred International, Inc., 1995, Connell, WA. Laboratory (greenhouse).
	Nev.Syn.XX	Nev.Syn.YY		90	~200		19.9	
	Lahontan (S)			9	~200			
	SCORING SYSTEM:	Standard test.						

10. C. NEMATODE RESISTANCE (Continued):

NEMATODE	VARIETY	SYN. GEN. TESTED	PERCENT RESISTANT PLANTS	NUMBER OF PLANTS TESTED	ASI	ASI LSD .05	INSTITUTION, YEAR, LOCATION, FIELD OR LABORATORY
Southern Root Knot *(Meloidogyne incognita)*	Application HR	1	67	~250		% resistant plants 14.1	Crop Characteristics, 1995, Northfield, MN. Laboratory (greenhouse).
	Moapa 69 (R)		50	~250			
	Lahontan (S)		4	~250			
	SCORING SYSTEM: Standard test.						
Stem Nematode *(Ditylenchus dipsaci)*	Application MR	1	24	~250		% resistant plants 13.3	Pioneer Hi-Bred International, Inc., 1995, Connell, WA. Laboratory (greenhouse).
	Lahontan (R) Vernema HR		60	~250			
	Ranger (S)		7	~250			
	SCORING SYSTEM: Standard test.						
Other *(Specify)*	Application						
	(R)						
	(S)						
	SCORING SYSTEM:						

11. INDICATE THE VARIETY THAT MOST CLOSELY RESEMBLES THE APPLICATION VARIETY FOR EACH OF THE FOLLOWING CHARACTERS:

CHARACTER	VARIETY	CHARACTER	VARIETY
Winterhardiness	5683	Plant Color	-
Recovery After 1st Cut	5683	Crown Type	5683
Area of Adaptation	5683	Combined Disease Resistance	5454
Flowering Date	-	Combined Insect Resistance	5888

REFERENCES

Barnes, D.K. 1972. A System for Visually Classifying Alfalfa Flower Color. U.S. Dep. Agric. Handb. 424. 18 pp. (Note: Greenish cast of plate 6, A and B is an artifact of printing, actual colors a blend of yellow and white.)

Elgin, J.H., Jr., (ed.). 1982. Standard Tests to Characterize Pest Resistance in Alfalfa Cultivars. U.S. Dep. Agric. Tech. Bull. (In Press).

Gunn, C.R., W.H. Skrdla, and H.C. Spencer. 1978. Classification of Medicago sativa L. using legume characters and flower colors. U.S. Dep. Agric. Tech. Bull. 1574. 84 pp.

Munsell Color Co. 1977. Munsell Plant Tissue Color Charts. Munsell Color Co., Inc. Baltimore.

NOTE: Any additional descriptive information and supporting documentation may be provided as Exhibit D.

EXHIBIT D

5681

1. 5681 is a synthetic variety of 195 parental plants tracing to three lines. Sixty-five (65) parental plants were selected through phenotypic selection for resistance to Phytophthora root rot and Anthracnose (Race 1) using sequential inoculations from a Pioneer experimental. Sixty-five (65) parental plants from a Pioneer experimental and sixty-five (65) parental plants from the commercial cultivar "Archer" were selected through phenotypic selection for resistance to spring black stem. 5681 traces to Archer (34%), Meteor (16%), CUF101 (16%), 555 (6%), Mercury (3%), with minor contribution from 524, 526, 5331, 5432, Apollo, NCMP10 and others with minor contributions. Germplasm sources are: *Medicago falcata* (2%), Ladak (4%), *M. varia* (11%), Turkistan (8%), Flemish (15%), Chilean (6%), Peruvian (t), Indian (2%), African (16%), and unknown (36%).

2. 5681 is intended for use in the southwestern part of the U.S. and other areas of the world were semidormant alfalfas are grown. It has been tested for yield in California, Argentina, Australia, and Spain and is intended to be used in these areas.

3. 5681 is a semidormant cultivar with a fall dormancy similar to Meteor. Flower color of the Syn 1 is 76 % purple, 1% cream, 1% yellow, 22% variegated with a trace of white.

4. 5681 has high resistance to anthracnose (Race 1), Fusarium wilt, Phytophthora root rot, root-knot nematode (southern), and spotted alfalfa aphid; resistance to bacterial wilt, pea aphid, and blue alfalfa aphid; and moderate resistance to Verticillium wilt, stem nematode, and root-knot nematode (northern). 5681 has not been tested for resistance to Aphanomyces root rot.

5. Breeders seed (Syn 1) was produced in 1991 on parent plants in "cage isolation" and bulked. Seed classes will be breeder, foundation (Syn 2 or Syn 3) and certified (Syn 2, Syn 3, or Syn 4). Foundation seed may be produced from breeder or foundation. The second generation foundation (Syn 3) may be produced at the discretion of Pioneer Hi-Bred International, Inc. Limitations on age of stand will be three years and five years, respectively, for foundation seed and certified seed. Sufficient breeder and/or foundation seed for the projected life of the variety will be maintained by Pioneer Hi-Bred International, Inc.

6. Seed will marketed in the fall of 1996 in the U. S.

7. Application for Plant Variety Protection will be made, and the certification option will not be requested.

8. As a means of added varietal protection, information included with the application for Review of Alfalfa Varieties for Certification may be provided to the PVP office.

9. Variety name: 5681 Date submitted: November 30, 1995.
   Experimental designations: YAS44, XAS44

Exhibit C and D

'5681'

Flower color reconciliation

In Exhibit C it is reported that 8% of the flowers are variegated other than blue (Subclasses 2.1, 2.2, 2.5 to 2.9) and 16% are blue (Subclasses 2.3 and 2.4). The Exhibit D, on the other hand, is the format we use for review board and includes all subclasses 2.1 to 2.9 to present flower color data. In this case we presented 5681 as having 22% of variegated flowers. The difference between the 22% variegated used for review board and the 24% (8%+16%) presented in Exhibit C comes from the use of a different set of earlier data on for the review board. The 2% difference between the flower color frequency, typically does not constitute a significant difference for this type of data. However, if the needs justify it, exhibit D could be modified to show 24% of variegated flowers instead.

REPRODUCE LOCALLY. *Include form number and date on all reproductions.* FORM APPROVED - OMB NO. 0581-0055 EXPIRES: 12-31-96

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE
SCIENCE AND TECHNOLOGY DIVISION - PLANT VARIETY PROTECTION OFFICE

EXHIBIT E
STATEMENT OF THE BASIS OF OWNERSHIP

The following statements are made in accordance with the Privacy Act of 1974 (5 U.S.C. 552a) and the Paperwork Reduction Act (PRA) of 1995.

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S)	2. TEMPORARY DESIGNATION OR EXPERIMENTAL NUMBER	3. VARIETY NAME
Pioneer Hi-Bred International, Inc.	XAS44	5681

4. ADDRESS *(Street and No., or R.F.D. No., City, State, and ZIP Code, and Country)*	5. TELEPHONE *(include area code)*	6. FAX *(include area code)*
7305 N.W. 62nd Ave. P.O. Box 287 Johnston, IA 50131	(515) 270-3340	(515) 270-3750

7. PVPO NUMBER 9600332

8. Does the applicant own all rights to the variety? *Mark an "X" in appropriate block.* If no, please explain. [X] YES [ ] NO

9. Is the applicant (individual or company) a U.S. national or U.S. based company?
If no, give name of country _____ [X] YES [ ] NO

10. Is the applicant the original breeder? If no, please answer the following: [X] YES [ ] NO

a. If original rights to variety were owned by individual(s):
Is (are) the original breeder(s) a U.S. national(s)? If no, give name of country _____ [X] YES [ ] NO

b. If original rights to variety were owned by a company:
Is the original breeder(s) U.S. based company? If no, give name of country _____

11. Additional explanation on ownership *(If needed, use reverse for extra space):*

Pioneer Hi-Bred International, Inc., Des Moines, IA, is the employer of the plant breeers involved in the development and evaluation of 5681.Pioneer Hi-Bred International, Inc. has the sole rights and ownership of 5681.

PLEASE NOTE:

Plant variety protection can be afforded only to owners (not licensees) who meet one of the following criteria:

1. **If the rights to the variety are owned by the original breeder, that person must be a U.S. national, national of a UPOV member country, or national of a country which affords similar protection to nationals of the U.S. for the same genus and species.**

2. **If the rights to the variety are owned by the company which employed the original breeders(s), the company must be U.S. based, owned by nationals of a UPOV member country, or owned by nationals of a country which affords similar protection to nationals of the U.S. for the same genus and species.**

3. **If the applicant is an owner who is not the original breeder, both the original breeder and the applicant must meet one of the above criteria.**

The original breeder may be the individual or company who directed final breeding. See Section 41(a)(2) of the Plant Variety Protection Act for definition.